UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 09513

CSAH NO. 61

OVER

THE ST. LOUIS RIVER

DISTRICT 1 - CARLTON COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 70)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 09513, Piers 1 through 3, were found to be in good to satisfactory condition. An 8-foot-long steel collar has been placed around a steel pipe pile on Pier 3 and it exhibited nodular corrosion with up to 1/16-inch section loss. The corrosion on the steel pipe piles has increased since the previous inspection, but still has not compromised the structural integrity of the piles. A moderate accumulation of timber debris was encountered at all piers. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes, aside for some minor aggredation, since the previous inspection.

INSPECTION FINDINGS:

(A) The steel pipe piles were in good and sound condition with minor coating failure affecting 10 to 25 percent with up to 1/2-inch-diameter nodular corrosion on the upper potion of the pipe piles, and 25 to 50 percent coating failure with up to 1.5-inch-diameter nodular corrosion on the lower portion of the pipe piles. The nodular corrosion had minimal pitting associated with it.

(B) A steel collar extending from the channel bottom to 8 feet above the channel bottom was observed on the second pile from the upstream end of Pier 3 and it exhibited 100 percent nodular corrosion with up to 1/16 inch section loss.

(C) A moderate accumulation of 1-foot-diameter and smaller timber debris was observed at all of the piers. The extent of the accumulations typically ranged from 1 foot above the channel bottom scattered throughout the piers to 3 feet above the channel bottom at the upstream ends of the piers with a few pieces extending to the waterline at Pier 1.

RECOMMENDATIONS:

(A) Monitor the moderate accumulations of timber debris from around the piers, and if found to be progressing, removal during routine maintenance of the bridge may become warranted.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 09513

Feature Crossed: The St. Louis River

Feature Carried: CSAH No. 61

Location: District 1 - Carlton County

Bridge Description: The superstructure consists of four spans of multiple concrete beams supporting a concrete deck. The superstructure is supported by two concrete abutments and three steel shell pile piers, with the piers numbered 1 to 3 from the west.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matt J. Lengyel

Date: August 31, 2002

Weather Conditions: Sunny, "75E F

Underwater Visibility: "2 feet

Waterway Velocity: "1 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 3.

General Shape: Piers 1, 2, and 3 are made up of a single line of 6 concrete filled steel shell piles supporting a concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 16.4 feet

4. WATERLINE DATUM

Water Level Reference: The top of the cap at the South end of Pier 3.

Water Surface: The waterline was approximately 11.5 feet below reference.
Water Elevation = 1106.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

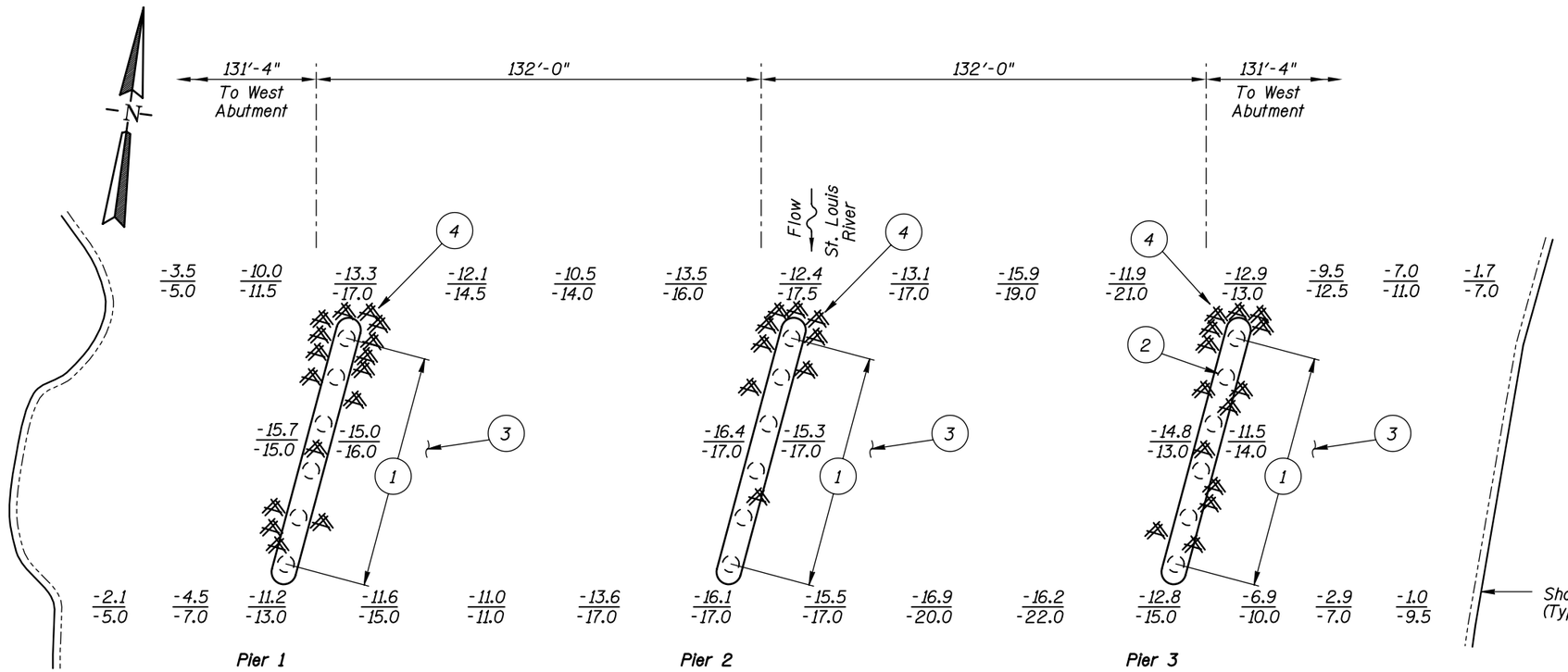
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/8/02

Item 113: Scour Critical Bridges: Code O/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

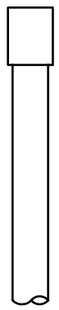
Yes X No



SOUNDING PLAN

GENERAL NOTES:

1. Piers 1 through 3 were inspected underwater.
2. At the time of inspection on August 31, 2002, the waterline was located approximately 11.5 feet below the top of the pier cap at the downstream end of Pier 3. This corresponds with a waterline elevation of 1106.5 based on the previous report dated September 28, 1992.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.



TYPICAL END VIEW OF PIERS

INSPECTION NOTES

(1) The steel pipe piles exhibited minor coating failure ranging from 10 to 25 percent with up to 1/2-inch-diameter nodular corrosion from the waterline to 8 feet below, and 25 to 50 percent coating failure with up to 1/2-inch-diameter nodular corrosion from 8 feet below the waterline to the channel bottom.

(2) A steel collar extending from the channel bottom to 8 feet above the channel bottom with 100 percent nodular corrosion and up to 1/16-inch-deep section loss.

(3) The channel bottom consisted of sand and gravel with 8 inches of probe rod penetration and occasional cobbles and riprap.

(4) A moderate accumulation of 1-foot-diameter and smaller timber debris, ranging from 3 feet high off the channel bottom at the upstream end of the piers to 1 foot high throughout the pier, was observed on the channel bottom.

Legend

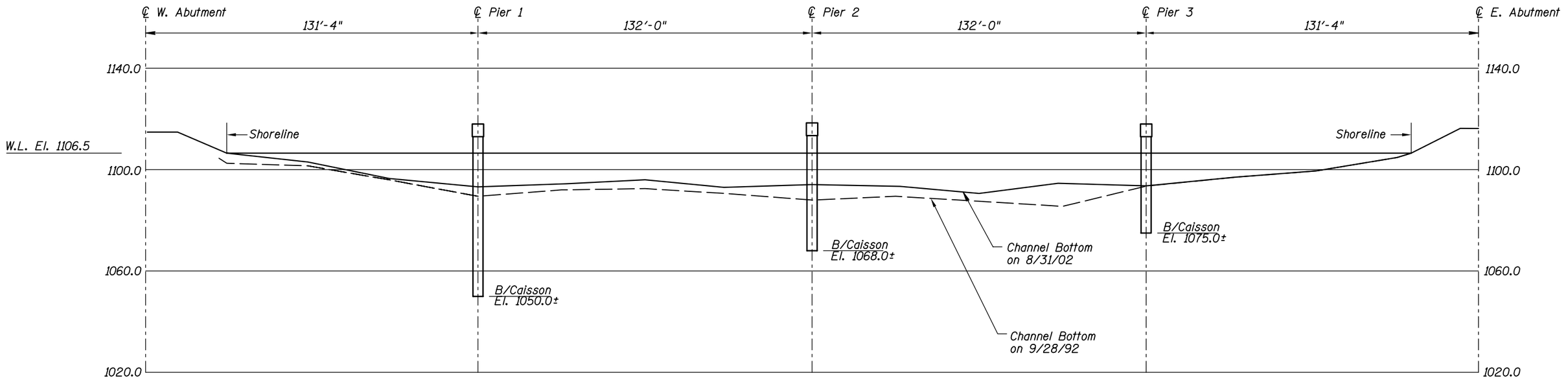
-2.0 / -5.2	Sounding Depth from Waterline (8/31/02) / Sounding Depth from Waterline (9/28/92)
◯	Steel Shell
	Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

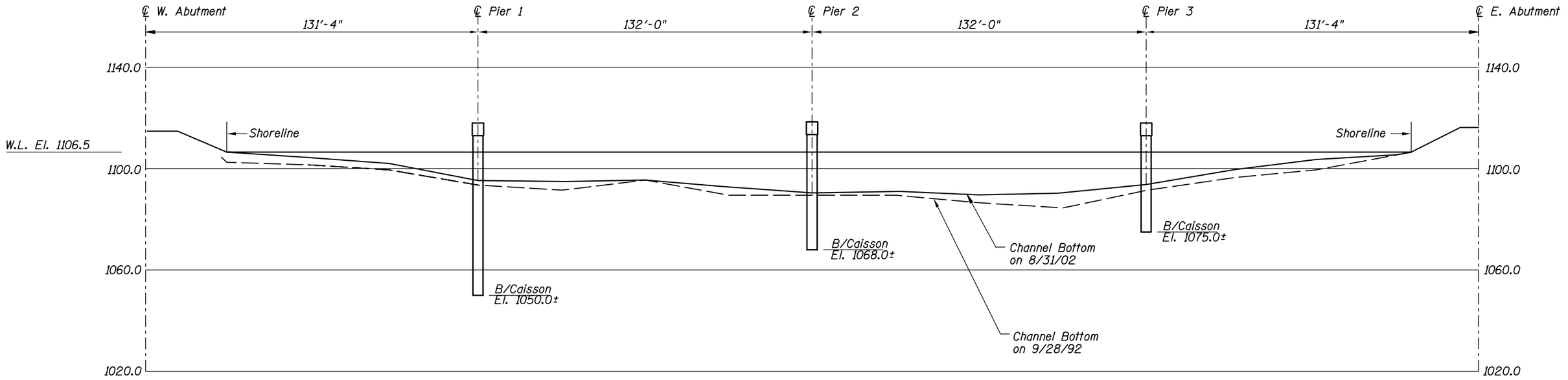
STRUCTURE NO. 09513
OVER THE ST. LOUIS RIVER
DISTRICT 1, CARLTON COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120070		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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OVER THE ST. LOUIS RIVER
DISTRICT I, CARLTON COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=40'
Code: 35120070		Figure No.: 2

Photograph 1. View of Pier 1, Looking Northeast.

Photograph 2. View of Pier 2, Looking Northeast.

Photograph 3. View of Pier 3, Looking West.

Photograph 4. Overall View of the Structure, Looking Southwest.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 31, 2002

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 09513 WEATHER: Sunny, "75EF

WATERWAY CROSSED: The St. Louis River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR

OTHER

PERSONNEL: Michelle D. Koerbel, Matt J. Lengyel

EQUIPMENT: SCUBA, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 11:10 A.M.

TIME OUT OF WATER: 12:20 P.M.

WATERWAY DATA: VELOCITY "1 f.p.s.

VISIBILITY "2 feet

DEPTH 16.4 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1 through 3

REMARKS: Overall, the steel pipe piles were in good and sound condition with minor coating failure ranging from 10 to 25 percent with up to 1/2-inch-diameter nodular corrosion on the upper potion of the pipe piles to 25 to 50 percent coating failure with up to 1.5-inch-diameter nodular corrosion on the lower portion of the pipe piles. A 4-inch-thick steel collar extending from the channel bottom to 8 feet above the channel bottom was observed on the second pile from the upstream end of Pier 3 and exhibited 100 percent nodular corrosion with up to 1/16 inch section loss. There was a moderate accumulation of timber debris at all of the piers with the heaviest amount at the upstream ends.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Monitor the moderate accumulations of timber debris from around the piers, and if found to be progressing, removal during routine maintenance of the bridge may be warranted.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 09513
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
WATERWAY CROSSED The St. Louis River

INSPECTION DATE August 31, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	15.7’	7	N	N	9	N	7	7	N	N	6	6	N	7	N	N	N	N
	Pier 2	16.4’	7	N	N	9	N	7	7	N	N	6	6	N	7	N	N	N	N
	Pier 3	14.8’	7	N	N	9	N	7	7	N	N	6	6	N	7	N	7	7	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the steel pipe piles were in good and sound condition with minor coating failure ranging from 10 to 25 percent with up to 1/2-inch-diameter nodular corrosion on the upper potion of the pipe piles to 25 to 50 percent coating failure with up to 1.5-inch-diameter nodular corrosion on the lower portion of the pipe piles. A 4-inch-thick steel collar extending from the channel bottom to 8 feet above the channel bottom was observed on the second pile from the upstream end of Pier 3 and exhibited 100 percent nodular corrosion with up to 1/16 inch section loss. There was a moderate accumulation of timber debris at all of the piers with the heaviest amount at the upstream ends.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.